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09/511,398	02/23/2000	Tomohiro Okumura	00177/530809	3756

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EXAMINER

PADGETT, MARIANNE L

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 12/19/2001

16

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/511,398

Applicant(s)

Okumura et al

Examiner

M.L. Pidgeott

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) filed on 9/4/01

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 1-55 is/are pending in the application.

Of the above claim(s) 1, 3-9, 13-14, 16-23, 28-54 is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 2, 10-12, 15, 24-27 and 55 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 7

☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

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1. Applicant's election without traverse of species II (antenna) and Group I (plasma process and apparatus) in Paper No. 9 is acknowledged.

The elected claims are noted to be 2, 10-12, 15, 24-26 and 55. It is further noted that since preliminary amendment A deleted the dependence of claim 18 on claim 15, it does not read on the species that use antenna.

2. The disclosure is objected to because of the following informalities: proof reading is needed. For example on pages 2 and 6, lines 15 and 19 respectively, the variables in the chemical formulas need to be correctly subscripted.

Appropriate correction is required.

3. Claims 2, 10-12, 15, 24-26 and 55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the independent claims 2 and 15 "groove-like" is vague, indefinite and ambiguous, because it is unclear what kind of structure is "like" a groove, but is not a groove; or if applicant even intends to exclude grooves as the language used implies, especially since new claim 55 requires a "groove depth" to be present.

In claim 55, it is unclear how the plasma can be said to have "a groove depth", and what effect this might have on the apparatus structure.

In claims 11 and 25, what is intended by "... trap is ... outside ... window" is unclear. The window as claimed has no inherent inside or outside, unless one considers any structure that

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is not entirely encased inside the interior of the window to be outside of it, in which case plasma trap 9 shown in figure 8 of applicant's specification reads on both claim 10's "in the . . . window" and claim 11's "outside the . . . window", as the trap is formed in the surface of the window, but is not inside or in the interior, hence must be outside. Claims 12 and 26 have analogous problems, as the relationship of the window and the vacuum chamber is not clearly set forth. As the window would appear to be logically required to be a part of the vacuum chamber in order for it to be an entrance for the electromagnetic waves, what is meant by "between" is unclear. Again referring to figure 8, note that trap 9 can be considered to be between window 14 and the wall of the vacuum chamber on which the substrate electrode rests. More precise description of the intended configurations is recommended.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 2, 11-12, 15, 25-26 and 55 are rejected under 35 U.S.C. 102(a) as being anticipated by Higuchi et al.

Higuchi teaches a plasma apparatus and process using a coil (antenna) exemplified by Fig. 3 or 4 that are powered by RF frequencies of 1 MHZ to 200 MHZ, and may use a recessed dielectric window in the plasma apparatus vessel, as illustrated in Figures 9-14; with the exemplified depth at 5 cm. Particularly note Figures 9 and 10, where the later shows plasma distributions, that indicate plasma in the gap, groove, etc., between the wall of the Al vessel and ref. No. 211 (side wall) of the window. This may be called a plasma trap, and may be considered to be both between the chamber and the window, and outside the window. Also, see the abstract; col. 8, lines 35-63, esp. 60; col. 16, line 12-col. 17, line 63 and col. 18, lines 57-col. 19, line 14. It is noted that in col. 16-17, the RF frequency employed is exemplified by "13.56-KHz", which would appear to be a typographical error, since it is outside the range of frequencies disclosed for use with the coils in general on col. 8, and as MHZ is the unit that is typically employed with that value. However, the specific example is not necessary to supply the useful frequencies, given the initially disclosed useful range.

6. Yoshida et al (Abstract; Figures 1A-B, 3A-C, 6A-B & 8A-B; col. 3, line 63-col. 5, line 43 and claims) is equivalent to Higuchi et al, except, only provides an example of 13.56 MHZ frequency and no range.

7. Claims 10, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi et al as applied to claims 2, 11-12, 15, 25-26 and 55 above, and further in view of Chen

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et al (5,824,605) .

Higuchi et al do not teach a window configuration where the recessed area can be said to be "in" the window, however Chen et al (Abstract; Figures 1-4; col. 4, line 65-col. 6, line 30, esp. col. 5, lines 1-2, 10-29 and 51-65; and col. 7, lines 14-25) illustrates an alternate analogous configuration of the dielectric window, also used for adjusting the plasma distribution when treating substrates with coil/antenna induced plasma. It would have been obvious to one of ordinary skill in the art that this alternate configuration would have been capable of producing analogous effects, and which versions are employed would have depended on configuration considerations involving other chamber features or the substrate shape, etc., especially as Chen et al indicates that other lower window configurations, such as one that omits the tapered outer wall (i.e., analogous to the configuration of Higuchi et al), are considered useful.

8. Other art that use antennas to induce plasma, and have window/wall shape configuration that relate to the claim language include: Bhardwaj et al, Ventzek et al, Overzet et al, Howald et al, O et al, Hama, Ding et al, Tomoyasu, Plavidal et al and Shufflebotham et al. The patents to Cuomo et al and Barnes et al (5,543,184) have other plasma distribution effecting techniques that are of interest.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M.L. Padgett whose telephone number is (703) 308-2336. The examiner can normally be reached on Monday to Friday from about 8 am to 4:30 pm.

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The fax phone number for the organization where this application or proceeding is assigned is (703) 305-5408 (official); or 872-9310 (Official); or 305-6078 (unofficial).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Padgett:mv

December 10, 2001

December 18, 2001



MARIANNE PADGETT  
PRIMARY EXAMINER  
GROUP 1700